DOCUMENT RESUME

ED 179 644 UD 019 975

AUTHOR Haney, Walt; Kinyanjui, Kabiru
TITLE Competency Testing and Equal Educational Opportunity. IRCD Bulletin, Volume 14, Number 2. Spring, 1979.
INSTITUTION Columbia Univ., New York, N.Y. Inst. for Urban and Minority Education.
SPONS AGENCY Columbia Univ., New York, N.Y. ERIC Clearinghouse on the Urban Disadvantaged.; National Inst. of Education (DHEW), Washington, D.C.
PUB DATE 79
NOTE 13p.
AVAILABLE FROM Institute for Urban and Minority Education, Box 40, Teachers College, Columbia University, New York, NY 10027 ($1.00)
JOURNAL CIT IRCD Bulletin; v14 n2 Spr 1979

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Black Achievement; *Black Students; *Educational Quality; *Equal Education; Grouping (Instructional Purposes); *Minimum Competency Testing; Minority Group Children; *Racial Differences; Remedial Instruction; Secondary Education; *Test Bias; Test Validity

ABSTRACT

After a period of striving for equal educational opportunity and progress toward that goal, American society is now shifting toward more emphasis on educational quality. However, some fear that the rise of Minimum Competency Testing (MCT) may hinder rather than help minority students' opportunities for equal education. Despite gains in the number of years of schooling, black students still fall far behind their white classmates in terms of test results. Racial disparities also appear in the area of curricular track enrollment since test scores determine who gets assigned to which high school tracks, and high school tracks help determine standardized test performance. Although the issue of test bias is relatively recent, much attention has been paid to possible remedies, including group parity models, which have been criticized as ineffective and discriminatory against other minority groups. Whether competency tests are unfair or biased depends on what happens to students who pass or fail the tests. If students who do not pass competency tests receive effective instruction to help them master basic skills or competencies and hence to proceed with their education, then the impact of MCT on equal educational opportunity may be positive. If not, the outlook is not promising.
(Author/RLV)

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ED179644

IRCD Bulletin

A Publication of the Institute for Urban and Minority Education
Teachers College, Columbia University

Volume XIV, Number 2 Spring 1979

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Competency Testing and Equal Educational Opportunity

Walt Haney
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Introduction

> According to a breakdown of results from the first round of testing of 120,000 Florida high school juniors last October, only 23 percent of black students passed the math part of the Florida Functional Literacy Test, compared with 76 percent of whites. The gap narrowed in the communications section of the two-part "survival skills" survey, with 74 percent of black and 97 percent of white high school juniors achieving passing scores. ("Florida Breaks Down Test Scores," 1978)

The minimum competency testing movement arose fast in the late 1970s amid considerable controversy. Several dozen states now have plans for competency testing of one sort or another, and several national conferences have been held to debate the vices and virtues of such plans. Although the movement focused initially on secondary education—most commonly on competency testing as a prerequisite to high school graduation—such testing has since been recommended for the early elementary grades (National Academy of Education, 1978) and now appears to be spreading to institutions of higher education ("All to Begin Testing," 1978).

At first glance, the movement might seem to have emerged out of theories of competency-based education (Spady, 1977; Block, 1978). The notion behind such theories is that schools ought to be organized so as to develop specific competencies among all students. This sounds plausible, but if one looks to this literature in trying to identify the nature of the attributes that schools should be designed to promote, pickings are slim indeed. In an article entitled "The 'C' in CBE," this is as close as one CBE theorist gets to defining competencies:

> Competent students are those who can, and want to, interact effectively with the three kinds of environments posed by the socially-ascribed, self-selected, and self-developed roles they face upon graduation from high school. Such students possess the particular competencies required to master each of these environments in motor and intellectual terms and in emotional terms. (Block, 1978, p. 13).

The power and precision of such analysis makes it seem somewhat implausible that the competency testing movement has grown out of thinking on competency-based education. Still, there do seem to be some common concerns in the writings on competency-based education and the plans to test competency. The concerns are that all is not well with our educational institutions. Spady and Mitchell (1977), for example, suggest that advocates of competency-based education are convinced that "the capabilities of too many high school graduates are inadequate to meet the requirements of life in modern societies" (p. 10). Similar worries seem to motivate proponents of competency testing.

In a keynote address to an HEW Conference on Achievement Testing and the Basic Skills, Harold Howe observed that "It seems probable that some erosion in school services to the general population may have been the price of moving toward equality of educational opportunity for those who have so long been denied it" (Howe, 1978). In other words, after a period of striving for equal educational opportunity and progress toward that goal, American society is now shifting toward more emphasis on educational quality. If this is so, it is relevant to ask how the new schemes to improve educational quality will affect equality of educational opportunity.

This question is the central theme of this essay: How will competency testing affect equality of educational opportunity—and in particular the prospects of minority students?

Very different opinions have already been expressed on this subject. New York Regent Kenneth Clark has supported his state's competency testing plan in part because he apparently believes that competency testing will help hold the schools accountable for teaching minority students (*Minimum Competence*, 1978). In North Carolina, however, minority leaders proposed a boycott of the statewide competency test because they feared its adverse impact on minority students ("Competency Test Boycott Proposed," 1978). In Florida, attorneys for ten black high school students filed suit against the state's competency testing program, charging that it is unconstitutional and discriminates against minorities ("Students File," 1978).

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After a trial of several weeks in the spring of 1979, Federal District Court Judge George Carr ruled, on July 12, in favor of the plaintiffs, holding that the Florida testing program violated both the equal protection clause and the due process clause of the Fourteenth Amendment of the U.S. Constitution. The state of Florida was specifically enjoined form using the functional literacy exam as a requirement for high school graduation until the 1982-83 school year (*Debra P. v. Turlington,* 1979). Since the Florida decision is, we understand, to be appealed, final resolution of the case remains in doubt. Nevertheless, the initial decision clearly highlights the worry that competency testing may hinder more than help minority students' opportunities for equal education.

Why should this be so? Two explanations seem obvious. First, minority students may do poorly on competency tests simply because their education has been of lower quality. Second, testing may have a disproportionate impact on minority students because the tests themselves are somehow biased against minorities. In the next two sections of this paper we will explore evidence for these two possible explanations. Before we turn to these issues, however, it may be helpful to explain the focus of the competency testing movement.

Programs in force around the country do not claim to test general competence. Rather, they tend to test *minimum* competency—that is, to assess whether students have attained certain minimum levels of competency. The focus on *minimum* competency is somewhat odd in view of the heated debate on how to go about setting minimum cut-off scores on competency tests (Glass, 1977). Given that controversy, it is curious that little attention has been given to a recent proposal for avoiding the inherent problems in setting and defending minimums. In March, 1978, Ellis Page, president-elect of the American Educational Research Association, proposed a system of scaled certification, which would designate a whole range of student competencies rather than simply marking individuals pass-fail in terms of minimum competency. Yet the Page proposal, unlike *minimum* competency testing, has not caught on.[2]

In short, it seems clear that minimum competency testing to improve the quality of education is aimed not at all students, but at those toward the bottom of the educational heap. Minority students are disproportionately represented at the lower end of the educational distribution. A Congressional Budget Office study, for example, recently reported that "Of a sample of 1972 high school seniors, 21 percent of the white students and 60 percent of the black students were in the lowest . . . quartile" on the composite index of high school rank in class and grade point average (CBO, 1977, p. 30-31).[3] As a result, minimum competency testing is likely to have substantial impact on them—whether it be beneficial or detrimental.

Equalized Educational Opportunity?

Are the educational opportunities of minorities in America equal to those of their more advantaged peers? This question has received much attention over the last thirty years. It was treated in Gunnar Myrdal's *American Dilemma,* and was the root issue behind the Supreme Court's 1954 decision in *Brown* vs. *Board of Education.* In the 1950s concern over equal educational opportunity was expressed mainly in terms of school desegregation. By the early 1960s, however, interest in other forms of educational equality began to rise. This was reflected in a variety of publications that were widely circulated: James B. Conant's *Slums and Suburbs,* published in 1961, Patricia Sexton's *Education and Income* in 1964, Francis Keppel's *The Necessary Revolution in American Education* the following year, and Arthur Wise's *Rich Schools, Poor Schools* in 1968. But despite the proliferation of such books, the key document on the topic of equality in education in the 1960s was undoubtedly a government report quietly issued in the summer of 1966—the *Equal Educational Opportunity Report,* commonly known after its chief author as the Coleman report.

Though released without fanfare by the Office of Education and seemingly headed for obscurity, the Coleman report soon gained widespread attention because of what it said. The most startling findings were that school facilities for minority children were not greatly unequal to those for other children; and, even more surprisingly, that whatever differences in facilities that did exist had little if any discernible relationship to student achievement. As these findings became known, the report received extensive publicity and had a dramatic impact on thinking concerning educational equality. As Frederick Mosteller and Daniel Moynihan (1972) have observed,

> . . . before EEOR [Equal Educational Opportunity Report], "equality of educational opportunity" was measured in terms of school inputs, including racial mixture. By inputs, we mean physical facilities of schools and training teachers; by racial mixture, the Supreme Court's emphasis on integration. With the publication of the EEOR it became increasingly the practice, even the demand, that equality be measured by school outputs; that is to say, by the results of tests of academic achievement. (p. 6)

The authors did not hedge their position on equalization of educational opportunity. They recommended that:

> Both nationally and locally, we should reappraise the aims, goals, and measures of success in education. We should adopt equality of educational opportunity, defined for the moment as equality of educational achievement for the several ethnic/racial groups, as a national goal. (p. 52)

To some degree, the shift of attention Mosteller and Moynihan advocated—from educational inputs and processes to educational achievement—has happened. In debates over equality of education during the last decade, emphasis has increasingly been placed on the results of the educational process, rather than only on the process itself. Indeed, competency testing itself could be viewed as one step in this direction.

In the public discourse on equal educational opportunity, the second most noted statement after EEOR was *Inequality. A Reassessment of the Effect of Family and Schooling in America,* by Jencks, Smith, Acland, Bane, Cohen, Gintis, Heyns, and Michelson (1972). The volume was much discussed and debated. Even one of the persons listed as a co-author of the book reviewed it, stating in part:

> This book is about numbers. It is not about children, adults or other kinds of people; it is not about schools, families or other kinds of institutions . . . My position is that it fails to contribute to a meaningful public debate. (Michelson, 1972, p. 56)

What were the findings that spawned such disagreement, even among *Inequality*'s own authors? The volume has been summarized cryptically as saying that "nothing affects anything." The *Inequality* authors put it this way:

> Neither family background, cognitive skill, educational attainment nor occupational status explains much of the variation in men's income. Indeed when we compare men who are identical in all these respects, we find only twelve to fifteen percent less inequality than among random individuals. (p. 226)

Concerning the effects of race on inequality in educational attainment, Jencks et al. concluded:

> First, the overall difference between black and white educational attainment [in terms of years of schooling] is much smaller than the difference between black and white test scores, occupational status, income or almost anything else we can think of. Young blacks have nearly caught up with whites in terms of educational credentials. This has not enabled them to catch up in terms of other things, at least not yet. (pp. 142-143)

The message to those who were worrying about racial disparities in educational attainment seemed to be twofold. First, such disparities, at least in terms of years of schooling, are not as bad as might have been imagined. Second, whatever disparities there are don't seem to matter much in terms of other important outcomes such as income.

In the last half of the 1970s there have been several volumes and numerous articles dealing with this issue. In 1975, *Still a Dream*, by Levitan, Johnston, and Taggart concluded that "The educational advantages which blacks have gained since 1960 may be far less than optimum, and far less than what is necessary to establish true equality of opportunity, but they are crucially important steps toward that goal" (p. 104). In 1976 Richard Freeman reported in *Black Elite* that an expanding group of highly educated black professionals was emerging in American society. He portrayed educational opportunities fairly optimistically, reporting that blacks have made significant progress in numerous realms of education during the last two decades: increased educational attainment overall, but especially among the young; increased black enrollments in colleges and graduate schools; and desegregation of southern white colleges, to name just a few (p. 56). Freeman's analysis suggested also that the economic progress of the black elite was clearly related to its educational progress. He argued, however, that such a relationship was by no means automatic. Rather, he saw the crucial ingredient in black progress as being collective action, especially governmental antidiscriminatory measures.

While Freeman's analysis is in several important respects quite similar to that of Jencks et al., it suggests far more substance to black educational progress than does the *Inequality* book. It is useful to examine this difference in perspective. First and most obvious, Freeman's book came out four years after *Inequality* and so could draw on data from the early 1970s that had not been available to Jencks et al. Second, Freeman was dealing with inequality among *groups*, whereas Jencks et al. concentrated on inequality among *individuals*—a point noted by James Coleman and other critics of *Inequality* such as Lester Thurow. Third, *Black Elite* was not just "a book about numbers," as Michelson termed *Inequality*, but more an analysis of social processes; Freeman gave far more attention to the dynamics of social processes and the interaction of different influences than did Jencks et al.

Freeman, nevertheless, was looking at only part of the picture—the higher reaches of the educational distribution. Two more recent publications give a more comprehensive view of racial disparities in educational opportunities: the Congressional Budget Office's (CBO, 1977) *Inequalities in the Educational Experiences of Black and White Americans*, and the HEW-sponsored study *Minority Education 1960-1978: Grounds, Gains and Gaps*, by the ML-Group for Policy Studies in Education (1978).

In summary, the CBO study noted the diminishing gap in educational attainment between blacks and whites:

> The differences between the number of years of schooling completed by blacks and whites has [*sic*] been narrowing. Among persons born in the early 1900s black males completed about seven years of schooling while white males completed around 10.5 years. The school attainments of persons born about 25 years ago, however, are far more similar: black men have completed an average of just less than 12 years of school while white men have completed just over 13 years. (CBO, 1977, p. ix)

The CBO study noted, however, that test results present a very different picture of racial disparities in educational opportunity. Specifically it stated that "a recent examination of the nation's 17-year-olds by the National Assessment of Educational Progress revealed that 92 percent of white children, but only 58 percent of black children were functionally literate" (CBO, 1977, p. ix).

We have here two very different views of educational opportunity. In terms of average years of schooling, racial disparities appear to have diminished markedly. Yet in terms of test results a wide gap seems to remain. One obvious possible explanation for this divergence is the nature of educational achievement tests themselves. We will treat this issue in the next section, so here let us look more closely at disparities in terms of the educational process.

Summary data on median years of schooling completed inadequately reflect the distribution of years of schooling overall. This was shown by Reynolds Farley (1977). Adapted from his article, Table 1 shows educational attainment for black and white cohorts born from 1910 to 1949. Instead of median attainment, it shows the first and third quartiles of educational attainment for the two groups. Note the sharp differences when we compare attainment at these two points. At the first quartile points of the black and white educational distributions, the racial disparity has narrowed markedly over the last thirty-five years. At the third quartile, however, we see that after an initial decline, the disparity has actually been increasing in the last fifteen years. Yet, despite that increase, the data suggest that the racial disparity in educational attainment at the third quartile level remains substantially less than it was thirty-five years ago. Farley suggests that "Future trends in educational attainment depend largely upon college enrollment rates. If black enrollment rates approach

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The development of this paper was supported by the ERIC Clearinghouse on Urban Education pursuant to a contract with the National Institute of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express their judgment in professional matters. Prior to publication, the manuscript was submitted to the Diversity Task Force of the Institute for Urban and Minority Education, New York, New York, for critical review and determination of professional competence. This publication has met such standards. Points of view or opinions, however, do not necessarily represent the official view or opinions of either the Diversity Task Force or the National Institute of Education.

those of whites, the long-term trend toward educational convergence will continue" (Farley, 1977, p. 192).

Table 1: *First and Third Quartiles of Educational Status for Cohorts at Age 25 to 29, and Racial Difference*

Years of Birth of Cohorts	Year Reaching Ages 25-29	First Quartile			Third Quartile		
		White	Black or Non-White	Racial Diff.	White	Black or Non-White	Racial Diff.
Males							
1910-14	1940	8.3	3.7	4.6	12.5	8.8	3.7
1920-24	1950	9.0	5.6	3.4	12.8	11.5	1.3
1930-34	1960	10.0	7.8	2.2	13.8	12.4	1.4
1935-39	1965	11.4	9.4	2.0	14.1	12.6	1.5
1940-44	1970	11.9	9.8	2.1	15.2	12.7	2.5
1945-49	1975	12.2	11.5	.7	16.0	13.7	2.3
Females							
1910-14	1940	8.5	5.2	3.3	12.5	9.9	2.6
1920-24	1950	9.6	6.4	3.2	12.6	12.0	.6
1930-34	1960	10.5	8.6	1.9	12.8	12.5	.3
1935-39	1965	11.5	9.5	2.0	13.8	12.6	.2
1940-44	1970	11.9	10.0	1.9	13.7	12.7	1.0
1945-49	1975	12.1	11.3	.8	14.9	13.1	1.8

Source: Adapted from R. Farley, "Trends in Racial Inequalities:: Have the Gains of the 1960s Disappeared in the 1970s?" *American Sociological Review*, 42 (April 1977), 189-208. Data in this table were drawn by Farley from U.S. Bureau of the Census, Census of Population: 1950, P-C1, Table 115; Census of Population: 1960, PC (1)-1D, Table 173; Census of Population: 1970, PC (1)-D1, Table 199; Current Population Reports, Series P-20, No. 158, Table 4; No. 295, Table 1.

Since competency testing, at least at present, is most directly aimed at secondary schooling, let us focus on that segment in the remainder of this section. In the concluding section we will return to Farley's concern that in the longer term overall equity in black-white school attainment may depend more on college attendance rates than on rates of attainment in the pre-college years.

A variety of evidence on racial disparities in elementary and secondary schooling was reviewed by the ML-Group (1978). They concluded that at the elementary level (grades 2 to 6), blacks and whites are exposed to roughly the same amount of schooling (measured in terms of days of schooling per year and hours per day). At the secondary level, they concluded, parity has been at least roughly achieved in terms of such variables as hours of instruction, time spent on homework, and types of courses taken. (It should be noted that these findings did not hold up entirely for Hispanic students.)

Where, then, do the differences appear? Large black-white differentials in elementary and secondary schooling appear in two places: grade retention and curricular track. Evidence of grade retention shows up indirectly in terms of age/grade-level ratios. Since blacks tend to enter school younger than whites, these ratios are lower for blacks than for whites for the first few years of school:

> However, as the children progress through the system, blacks steadily lose their advantage, drawing even with whites at about age 9 (1969) or 10 (1976) and then dropping behind. By age 16, median grade placement for blacks is about 30 percent of a grade lower than for whites. (ML-Group, 1978, p. 165)

The second area in which racial disparities show up clearly is curricular track enrollment. Using data from the Project Talent survey for 1960 and from the National Longitudinal Survey for 1972, the ML-Group estimated that black enrollment in high school curricular tracks has shifted substantially, away from vocational/technical programs and toward general and academic programs. Nevertheless, the curricular enrollments of black and white students still differ considerably, as shown in Table 2. Note the discrepancy between curricular track enrollments reported by students and those reported by school survey administrators. Noting that "Overall, more blacks and fewer whites considered themselves to be in academic programs than were so designated by survey administrators," the ML-Group explained the divergence as follows: "These data suggest either unrealistically high academic expectations among blacks in high school or differential expectations of school staff for black and white students" (p. 222). However, the reports of both students and survey administrators show that black students are enrolled in academic track programs in lower proportion, and in general and vocational/technical tracks in higher proportion, than are white students. This appears to be related at least in part to differences in the socioeconomic status of black and white students, and in part to imprecision in the use of labels like "general curriculum" and "academic" or "college preparatory program."

Table 2: *Black and White Enrollments in High School Curriculum Programs, 1972, As Reported by Students and Survey Administrators*

As Reported by Students	Percent of Students Enrolled in: General	Academic	Vocational/ Technical
White	32.7	45.4	22.5
Black	32.6	32.9	34.3
As Reported by School Survey Administration	**General**	**Academic**	**Vocational/ Technical**
White	28.5	48.1	23.4
Black	43.5	27.9	28.6

Source: ML-Group, *Minority Education, 1960-1972, Grounds, Gains, and Gaps*. Chicago, Illinois: CEMREL, Inc., September, 1978, pp. 218, 224. These data are drawn from the National Longitudinal Survey of the class of 1972.

Nevertheless, whatever its sources, the racial disparity in high school curricular track enrollments seems to be fairly substantial, according to the latest data available—with 15 to 20 percent fewer blacks enrolled in academic tracks than might be expected on the basis of enrollment in high school generally. The data from which these findings were drawn are nationwide, whereas competency testing results are available only from a few states. Nevertheless, it seems clear that the substantially greater failure rates of blacks on state minimum competency tests (in Florida, 20 to 50 percent greater) may be due at least partly to their lower rate of enrollment in academic curriculum tracks in high school.

It comes as no surprise, of course, that curriculum track enrollment is linked to test scores. Persell (1977), among others, has shown that test scores help determine who gets assigned to which high school tracks, and high school tracks in turn help determine standardized test performance at the end of high school. Related factors appear to be differential grade retention and dropout rates. Before examining what racial disparity in these educational process variables implies for the impact of minimum competency testing on educational opportunities of minorities,

let us discuss the possibility that tests themselves are biased against minorities.

Test Bias: Are the Measures the Message?

Are competency tests themselves somehow biased against minority groups? Certain ethnic minorities consistently score below majority students on most standardized tests. In the National Assessment of Educational Progress, for example, it was found that nationwide, on average, black children aged nine, thirteen and seventeen scored from 10 to 20 percentage points below the national average on tests of reading, mathematics, science, social studies, and career and occupational development (Golladay, 1978, p. 94). Also, of course, it is fairly well known that blacks, on average, score 10 or more points below whites on standardized tests of intelligence or I.Q. (Matazarro, 1972).

These differences are confounded with racial disparity in other variables such as socioeconomic status, family income, and parental education, and much social research has been devoted to the relationships between race, test scores, socioeconomic status, and education. Perhaps the most controversial have been studies on the heritability of intelligence, or more specifically the heritability of intelligence test scores. Numerous analysts have tried to assess the relative contributions of heredity and environment to intelligence test scores. Some too have tried to link such analyses to racial disparity in test scores, and to estimate whether there are innate racial differences in intelligence test scores. For an excellent collection of articles on these issues, we refer anyone interested to *The I.Q. Controversy* (Block and Dworkin, 1976). Our own summary view is the following. First, these studies often reveal more about those who make them than about the nature of the world. Second, most of the research on intelligence testing has been conducted by psychologists trained in the psychometric tradition, which emphasizes *individual* differences, pays relatively little attention to social processes, and tends to be based on atheoretical operationalism.

Third, analysts too often make the easy inference that intelligence tests measure intelligence. This assumption is handy for those who would analyze the results of intelligence testing, but it ignores several obvious attributes of intelligence tests. Supposed tests of intelligence, for example, tend to have markedly different substance for people of different ages, such as preschoolers versus adults. Most validation studies of intelligence tests use criteria that are essentially indicators of success in the social realm—grades in school, ratings by employers, or occupational success. In this connection, we think it significant that the Psychological Corporation, in publishing a new edition of the Otis-Lennon Mental Ability Test, has plans to rename it the Otis-Lennon School Ability Test (Lennon, 1979).

The growing modesty in nomenclature is surely warranted, since "mental ability" tests typically are validated not by any independent criterion of mental ability or capacity but simply in terms of school success or some other social rating. That being so, an obvious question is whether these tests really measure the same thing for people of different cultural or social backgrounds. In other words, given the social and cultural dependency of such measures, is it possible that they are biased with respect to persons from minority social or cultural groups?

Before we analyze what saying that a test is biased might imply, let us offer a few prefatory remarks. First, strictly speaking it is meaningless to say that a test per se is biased.[4] What is really at issue is whether a test is biased with respect to a particular *use*, for example in drawing an inference or making a decision about a person or group. Second, while people sometimes call a test biased because it yields different results with different persons, or groups, we do not find this a useful definition. As Eric Gardner (1978) has observed:

> Lower scores *alone* on an achievement test do not signify bias. If they did, then every spelling test would be biased against poor spellers, every vocabulary test against persons who had poor vocabularies, and every shorthand test against persons who had never learned shorthand. (p. 3)

Rather, we would term a test biased if, when it is used to make decisions or inferences about a person or group, those decisions or inferences are less valid than those made when it is used analogously with people generally. Note that this definition rests at root on the *validity* of decisions or inferences based on the test. Since little validity evidence is available on the minimum competency tests introduced in the last couple of years, we will have to keep the discussion in this section at a fairly general and theoretical level.[5] Nevertheless, we think it will prove useful to trace how thinking concerning test bias has evolved over the last decade or so.

Many uses of test results, such as by school counselors in offering students vocational guidance or in other clinical settings, are so amorphous that they cannot be defined precisely enough to allow direct analysis. Bias in such use of test results may indeed be a big problem, but because the uses are vague, most work on the issue of test bias has focused in recent years on more sharply defined uses of tests or inferences based on them. In particular, most recent writing on the issue of test bias has concerned the use of test results in educational or employment selection. There, the inferences drawn from test results can be clearcut— either to select or to reject a candidate. Because of the importance of this use of test results and the clarity of the inferences drawn, much has been written in the past decade or so on the subject of bias in selection testing—or, as it is sometimes called, fair selection procedures. At least

IRCD Bulletin

Published quarterly by the Institute for Urban and Minority Education. Subscription rate: $4.00 per year. Back issues: 1-9 copies, $1.00 each; 10-24 copies, $0.80 each; 25-49 copies, $0.60 each; 50 copies and over, $0.50 each.

Editor: Edmund W. Gordon
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Send all communications to Institute for Urban and Minority Education, Box 40, Teachers College, Columbia University, New York, New York 10027.

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in principle, such thinking could be applied to other test uses—for example, using competency tests to award or deny a high school diploma.

Before the late 1960s, little attention was given to the issue of test bias. The index in Thorndike's *Educational Measurement* includes not a single listing for bias or test bias. Nevertheless, insofar as the issue was examined, ideas about what constituted test bias were fairly consistent, at least among specialists. A test might be considered biased if it did not predict some criterion (say college grades or job performance) for some group in the same way as it did for people generally. This question typically would be addressed in terms of the regression equation relationships (slope, intercept, and variability of residuals) between test scores and some criterion (Linn, 1976)[4], as for example by Cleary (1968) in comparing how well test scores predicted grades for black and white students in integrated colleges. Cleary defined the regression approach to test bias determination as follows:

> A test is biased for members of a subgroup of a population if, in the prediction of a criterion for which the test was designed, consistent non-zero errors of prediction are made for members of the subgroup. In other words, the test is biased if the criterion score predicted from the common regression line is consistently too high or too low for members of the subgroup. With this definition of bias, there may be a connotation of "unfair," particularly if the use of a test produces a prediction that is too low. (Cleary, 1968, p. 115)

Defining bias thus, Cleary studied the case of the Scholastic Aptitude Test (SAT) and high school grades in predicting college grades for black and white students. She concluded: "In the three colleges studied, there was little evidence that the Scholastic Aptitude Test is a biased predictor of college grades." Indeed, in one case she found that the SAT overpredicted college grades for black students, suggesting that the test was biased in favor of blacks.

In the early 1970s, however, several new formulations of fair selection and test bias prompted considerable reexamination of these issues (Thorndike, 1971; Cole, 1973; Linn, 1973). As a group, these formulations have been termed group parity models. They have been compared within a single framework by Petersen and Novick (1976) and Novick and Ellis (1977) as, respectively, the constant ratio model; the conditional probability model; and the equality probability model. Since the seminal piece in stimulating rethinking on the bias issue was that of Thorndike (1971), let us briefly summarize his approach:

> If one defines "fair" use of a test . . . as providing each group the same opportunity for admission to training or to a job as would be represented by the proportion of the group falling above a specified criterion score on the correlated variable of training or job performance, then it does not matter particularly if the slope of the regression of criterion on test differs in the two groups. Having set a standard for the major group, one independently sets a critical score that will admit the required percent from the minor group (i.e., the percentage of the group that have been found to achieve the specified criterion score). (p. 68)

In effect, Thorndike argued that fair use of selection tests might require different cut-off scores for minorities than for majority individuals irrespective of the regression relationship between selection test scores and criterion performance. He was arguing essentially that a test could be fair for *individuals*, but still be biased against particular *groups* such as minorities.

The two other group parity definitions of fair selection (or conversely, test bias) differed from that of Thorndike mainly in terms of the probabilities by which they defined equitable selection. Cole (1973) suggested that individuals of both minority and majority groups should be so selected that those who can perform satisfactorily in terms of the criterion have equal probability of being selected regardless of group membership (the conditional-probability model). Linn (1973) proposed that individuals from different groups should be so selected that the proportion of those successful in terms of criterion performance is equal for the different groups (the equal-probability model).

As pointed out by Petersen and Novick (1976) and reiterated by Novick and Ellis (1977), the group parity models have several desirable features. They are fairly easy to understand and are intuitively appealing. They tend, for example, to imply lower cut-off scores for persons to whom most believe some preference shold be given, that is, those from disadvantaged groups, which typically score lower on such tests.

Nevertheless, these models have been challenged on both technical and theoretical grounds. Novick and Ellis (1977) summarize the arguments against them as follows:

> First, the group-parity models do not provide the amount of compensation for disadvantaged persons that many decision makers would deem appropriate. Under certain circumstances, they give substantial preference to the "minority" group as compared to the standard regression model (Cleary, 1968), and the Cole model provides greater preference than the Thorndike model (Novick and Petersen, 1976). But the work of Gross and Su (1975) and Breland and Ironson (1976) indicated that the Cole group-parity model will not yield the degree of increased selection of disadvantaged persons thought desirable in some situations (e.g., graduate selection programs).
>
> Second, group-parity methods, while possibly providing compensatory treatment for some disadvantaged persons, often do so at the expense of other disadvantaged persons. Petersen and Novick (1976) point out that these models can be used to discriminate against various ethnic groups (e.g., Japanese-Americans) and that generally they discriminate against women. . . .
>
> Third, within the disadvantaged group, group-parity models result in an inverse relationship between disadvantage and compulsion. thus, group-parity methods do not provide compensation to those members of a disadvantaged group who are the most disadvantaged. (p. 308)

Novick and Ellis go on to discuss the group-parity models in terms of constitutional issues and recent court decisions on employment selection and discrimination, generally questioning the consistency of group parity models with constitutional principles. They conclude that "What is required is a means of awarding compensatory treatment based on individual disadvantage rather than on possession of racial or ethnic characteristics" (p. 318), and observe:

> Statistical decision theory provides a framework for balancing the social costs of selecting those who are less qualified at a given moment with the increments in social gain from equalizing opportunity.
>
> The use of statistical decision theory requires the assessment of utilities and probabilities and the combination of these to obtain expected utilities for each possible decision (action). . .

> It is apparent that each person's overall utility for a particular outcome will depend on many facets of that outcome. Benefit provided the individual, the institution, and society at large may be matters of concern in any situation. The enhancement of the equality of opportunity is one social policy, which should be one major facet of society's utility function. Any selection act that tends to give a disadvantaged person an opportunity to overcome a disadvantage imposed by the circumstances of birth or social barriers will have higher social utility than the selection of another person for whom the utility components on all other facets are of identical value. The question of how much weight to give each facet is obviously a difficult one and one to which different answers will seem appropriate to different persons in different contexts. (pp. 318-319)

Novick and Ellis are arguing for a much broader formulation of fair selection and test bias issues. They are saying that bias in test use cannot be reduced to a technical question, and cannot be treated apart from the *social utility* associated with outcomes of test use.

We are in essential agreement with this conclusion, but note that their formulation clearly is an idealized one. As a practical matter, most social policies relate not to treatment of individuals in terms of their unique constellation of characteristics, but to treatment of people as members of particular social groups: e.g., people aged twenty-one or above, families with incomes below the poverty line, or registered voters. Also, of course, the premise of equal opportunity programs is not simply that certain individuals are disadvantaged, but that they have been unfairly discriminated against because of their *group* membership. In other words, if unfair discrimination is a group level phenomenon, it is hard to see how the remedy can avoid group parity considerations.

What does this have to do with whether or not competency tests are biased? Simply that this question cannot be reduced to a technical one. Ultimately, it must be considered in terms of the *use* of competency tests and the utilities one associates with the results of that use. In particular, we think that whether competency tests are unfair or biased depends on what happens to students who pass or fail the tests. In competency testing for high school graduation, students who pass will not be much affected; but what happens to those who do not pass is crucial. Given social commitment to equal opportunity, if a disproportionate number of minority persons fail the tests, and if as a result they are merely shunted aside and not instructed in the skills the tests are intended to represent, then we think the potential for bias or unfairness is indeed great. If, however, the tests serve as a trigger for providing students who do need help with fair and reasonable instruction in the skills the tests were designed to represent, then the likelihood of unfair use of competency tests is greatly diminished.

From this perspective, we are not too sanguine about prospects. Most minimum competency testing programs have not waited until the twelfth grade to test students. Students are usually given several chances to pass them, beginning early in their high school years. The idea is that those who do not pass the first time will receive remedial instruction to help them attain the minimum competencies. But little attention has been given to the sort of remedial help required by students who do not pass the first time around. Florida is again prototypical of this problem. Only after nearly 40 percent of eleventh graders taking the mathematics proficiency test in 1977 failed did the state "provide a compensatory education program that [in 1978] distributed $10 million to local districts (on the basis of state assessment scores) to provide remedial instruction" (Fisher, 1978, p. 601).

Florida officials assert that adequate attention has been given in that state to the issue of remediation. ("Florida Chief," 1978). The results of second-year testing in Florida suggest clearly that something has occurred to boost test performance:

> Thirty-nine percent of Florida's black high school juniors who took the state's fundamental literacy exam for the first time in October 1978 passed both math and communications sections, a net gain of 17 percent over October 1977. ("Black Students Performance," 1979)

Commenting on the second-year results, Florida State Superintendent of Education Ralph Turlington asserted:

> This should lay to rest any suggestions of racial or cultural bias in the test. Gains of 15 percent in communications and 17 percent in mathematics by our black 11th graders prove that point—in addition, more than half of the black students re-tested as seniors passed the test ("Black Students Performance," 1979)

In his decision on *Debra P.* vs. *Turlington* (1979), Judge Carr wrote:

> The defendants emphasized the increase in the percentage of Plaintiffs . . . who have passed the test since its first administration. While the increased passing rate is impressive and Florida teachers and students are to be commended for their achievement, the Court has serious reservations about attaching a constitutional imprimatur to a program which penalized students who have been denied equal educational opportunity. (p. 19)

In a later remark, however, the Court raised questions about whether the apparent increase in passing rate is at all meaningful:

> The effectiveness of the remediation programs is somewhat in doubt at the present time because of the failure of the state defendants to carry out equating studies. These studies would have shown the relative degree of difficulty among the three administrations of the functional literacy test. Based on the present evidence it is impossible to determine whether the tests are becoming easier or whether the remediation program is accomplishing its goal. (p. 42)

Apparently, little evidence was presented in the Florida case on whether test failure prompted a significant proportion of students to drop out of school. Nevertheless, despite this possibility and the equating issue, it is encouraging that half of the 8,000 black students who as 11th graders failed the test in 1977 passed it as 12th graders in 1978. Yet the fact that they were able to pass it one year later, after only part-time remedial instruction, certainly raises questions about the relationship between what they were taught in their first ten years of schooling and the content of the test. If the test is a valid measure of basic math and communication skills, we must wonder about the quality of the schooling these students had received.[7] Some have also questioned how the Florida test relates to remedial instruction for those who do not pass it the first time. Michael Scriven (1978), for example, has commented:

> My grapevine information from Florida suggests that the enormous improvement in success rates when those who failed the first time around retook the tests was due to ingenuity rather than increased competency. There were problems about the size of the pool [of test items used] and after

> a while, if you got help with the questions that you did not get right, you would eventually run into them again when you retook the test. There were other less attractive procedures used for getting people through, as one might expect. (p. 138)

Scriven seems to be suggesting that those who did not pass the Florida competency test the first time received only test coaching instead of instruction to help them master the general skills the test purports to measure. If that is so, then from the utilitarian perspective, the potential for bias in the test seems substantial.

Conclusion

Adjudication is still pending on Florida's competency testing program. Rather than speculate on the ultimate outcome of that case, let us draw back to consider the broader question of the relationship between testing and equal educational opportunity. In particular, what light does our survey of the literature on equal educational opportunity and on test bias shed on this question?

There is a very large discrepancy between the thinking on equal educational opportunity and that on test bias. As we recounted, the latest commentaries on the test bias issue suggest that bias cannot ultimately be determined outside a decision-theoretic framework that takes into account the social utility of decisions or inferences made on the basis of test results. We would point out that precisely the same logic applies to considerations of equal educational opportunity. That the utilitarian perspective has not informed recent discussion of educational equality is something of an historical anomaly. As long ago as 1920 Hugh Dalton criticized treatments of economic inequality in terms of common statistics as "clearly wrong." He observed that the economist should be primarily interested "not in the distribution of income as such, but in the effects of the distribution of income upon the distribution and total amount of economic welfare which may be derived from income" (Dalton, 1970). This social welfare or utilitarian view of income distribution was by no means unanimously accepted among economists in the last half century, although in the past decade interest in it has revived (spurred largely by the writings of Aigner and Heins, 1967, and Atkinson, 1970). Nevertheless, Atkinson made it clear that even if analysts do not give explicit attention to the utilitarian perspective, the statistics they use to measure inequality *implicitly* carry social-welfare or utility assumptions. That social scientists like Jencks can ignore this fact in their debates about educational inequality represents remarkable myopia—both historical and disciplinary.

Sociologists and other social scientists outside the economic realm often seem to have merely adopted the statistical tools of economists without adequately attending to the assumptions implicit in doing so. Indeed, in an appendix to *Inequality,* Jencks justifies his use of the coefficient of variation as a measure of inequality only in economic terms. He maintains that it helps avoid the problem of inflation that might artificially make the standard deviation increase or decrease when in fact there are no real changes in purchasing power.

With respect to *economic* inequality, such thinking makes some sense. At least in part this is due to the shape of the utility curve of income or wealth. At higher income levels, given increments of income afford decreasing degrees of utility. A one-thousand dollar bonus, for example, would mean far more to the man who makes $10,000 a year than to the one who makes $100,000.

However, with respect to educational attainment, utility curves may have a very different shape. This was clearly suggested in two series of psychophysical investigations of the relationships of social status with income and status with years of education. The experiments have been summarized by Robert Hamblin (1974), and more recently discussed in Coleman and Rainwater (1978). For the time being let us put aside discussion of how the "social status" assessed in these experiments relates to utility or welfare and assume that they are essentially equivalent.

In one series of experiments, subjects were asked to rate the amount of prestige, respect, or status they associated with different incomes. As economic theory would predict, the functions relating social status ratings and income were positive, but with decreasing slopes as income goes up. As a utilitarian might put it, the status-income function is increasing but concave downward, so that greater increments of income yield relatively smaller gains in status. The exact functions describing the results of the income-status ratings experiments are given in Table 3.

Table 3: *Results of Status-Income and Status-Education Psychophysics Experiments*

Status-Income Experiments

Experimenter	Sample	Function Relating Status Ratings and Income
Hamblin	College students	$S = .40\ (I\text{-}1{,}000)^{.54}$
Hamblin	Navy seamen	$S = .49\ (I\text{-}1{,}000)^{.52}$
Shinn	College students	$S = .30\ I^{.63}$

Status-Years of Education Experiments

Experimenter	Sample	Functions Relating Status Rating And Years of Education
Hamblin	College students	$S = (E + 4)^{2.05}$
Hamblin	Navy seamen	$S = (E + 4)^{2.14}$
Shinn	ROTC students	$S = .065\ (E + 6)^{2.40}$
Shinn	College students	$S = .067\ (E + 4)^{2.50}$
Shinn	College students	$S = .074\ (E + 4)^{2.46}$
Rainwater	Adults, Boston area	$S = .06\ (E + 6)^{2.6}$

Source: Taken from Tables 3.4 and 3.5 of Robert Hamblin, "Social Attitudes: Magnitude Measurement and Theory," in H.M. Blalock (ed.), *Measurement in the Social Sciences. Theories and Strategies* (Chicago: Aldine, 1974), pp. 61-120. We have omitted results of several experiments which Hamblin cited simply to avoid a detour explanation of the intricacies of fitting such power functions—for example segment fitting and origin corrections—which would add nothing to the immediate discussion. For a more general treatment of these issues, see Coleman and Rainwater (1978).

In the second series of experiments subjects were asked to rate the amount of status they associated with persons having had different numbers of years of schooling. The status/years-of-schooling functions were positive, like the status-income functions, but unlike them had *increasing* slopes. The functions estimated from the status-education experiments are also given in Table 3. Both sets of functions are power functions, but there is a striking difference in the two sets of equations. The income-status functions have exponents less than 1.0 whereas the education-status functions have exponents greater than 2.0.

This suggests clearly that a utilitarian approach—or at

least a status approach—to measuring inequality in years of schooling ought not to use the same measures as those used in assessing inequality of incomes. There are some real problems in trying to apply a utilitarian approach to measuring inequality in educational attainment, which we have dealt with elsewhere (Haney, 1977), and some of them we will come back to in a moment. But as a very crude application of utilitarian thinking to inequality in years of schooling, we can try the following. Let us simply define an educational status function in terms of years of school, as suggested by Hamblin's account:

$$S = (E + 5^{2.5})$$

Now for the sake of illustration, let us apply this formula for the relationship between educational attainment and associated status or utility to the data of Table 1. The results of this transformation are shown in Table 4. If we look at the racial difference over time for the first quartile, we see, as in Table 1, that there has been substantial decline in the last thirty-five years. Note, however, that the decline in the white/black status difference has been less than the decline in educational attainment per se. At the third quartile level, an even more striking change is apparent. For both males and females, the black/white difference in status associated with educational attainment for the cohort reaching ages 25-29 in 1975, is only marginally lower than the difference for the cohort reaching ages 25-29 in 1940. This suggests that, from a utilitarian perspective, much of the decline in the white/black educational attainment gap is more apparent than real. In other words, because differences in years of schooling make more difference in status at the higher end of the educational distribution than at the lower end, the status gap remains relatively large even though the attainment gap has narrowed.

Table 4: *First and Third Quartiles of Educational Status for Cohorts at Age 25 to 29, and Racial Difference*

Years of Birth of Cohorts	Year Reaching Ages 25-29	First Quartile			Third Quartile		
		White	Black or Non-White	Racial Diff.	White	Black or Non-White	Racial Diff.
Males							
1910-14	1940	645	223	422	1281	707	574
1920-24	1950	733	366	367	1337	1106	231
1930-34	1960	871	586	285	1532	1263	269
1935-39	1965	1089	787	302	1594	1300	294
1940-44	1970	1174	843	331	1834	1318	516
1945-49	1975	1227	1106	121	2021	1512	509
Females							
1910-14	1940	670	332	338	1281	857	424
1920-24	1950	814	439	375	1300	1192	108
1930-34	1960	946	682	264	1337	1281	56
1935-39	1965	1106	801	305	1337	1300	37
1940-44	1970	1174	871	303	1512	1318	194
1945-49	1975	1209	1073	136	1767	1394	373

Source: Derived from Table 1 using the equation $S = (E + 5)^{2.5}$, where S = educational status and E = educational attainment in years of schooling.

Clearly it would be unwise to place overmuch stock in the exact figures shown in Table 4. For one thing, the education-status function we used in deriving Table 4 from Table 1 was a rough estimate, and it seems highly unlikely that any such function, based as it is on social perceptions, has remained anywhere near constant over the past 40 years. Also, the assumption under which this discussion started, namely that status approximates utility, is somewhat shaky. Moreover, this sort of approach—implicitly aggregating utilities across individuals to draw inferences about aggregate utility for groups—carries with it assumptions of the additive separability of social utility. Amartya Sen, in a book entitled *On Economic Inequality*, has clearly shown such assumptions to be questionable in the economic realm, and the points he raises with respect to additive separability are especially pertinent in the education realm. Nevertheless, the utilitarian perspective on equality of educational opportunity does suggest that some of the much-noted diminution in the educational opportunity gap between blacks and whites (in terms of years of schooling) may be more illusory than real.

The utilitarian perspective also sheds a sobering light on the potential impact of competency testing on equal educational opportunity. From this perspective, the key question is what will happen to students as a result of competency testing. If students who do not pass competency tests receive effective instruction to help them master basic skills or competencies, and hence to proceed with their education, then the impact may be salutary. However, if that consequence does not follow, then the impact may be entirely detrimental. If students who fail competency tests the first time merely receive test coaching that does not help them master the real skills of interest (and one observer has suggested this is exactly what is happening in Florida), or if they are simply held back to repeat a grade (this is already happening to minority students in disproportionate numbers, as noted above), then the outlook is not promising. In terms of broader racial disparities in educational opportunity beyond secondary schooling, the prospects appear even more bleak. Racial disparities in educational opportunity, whether viewed in terms of years of schooling (Table 1) or in associated status (Table 4), appear greatest at levels of education *beyond* high school. Competency testing, focused as it is mainly on the high school level and emphasizing minimum skills, appears to hold little potential at all for reducing these disparities. Perhaps, then, we ought not to view competency testing as a remedy for what Harold Howe called "erosion in school services to the general population [which] may have been the price of moving toward equality of educational opportunity for those who have so long been denied it." Perhaps instead we should view this movement and our early experience with it as a sign of how much further we have to go toward achieving equality of educational opportunity. To some, this view may seem part of "The reaction of much of the scholarly community in education to the call for educational standards [which] has been distressing in its negativism" (Gallagher, 1979, p. 65).

Lest anyone should mistake us, we should like to make clear in conclusion that we by no means think that competency testing, or at least educational assessment generally, necessarily need adversely affect equality of educational opportunity. We would simply point out that equal opportunity *is* an educational standard in America. Our concern is that competency testing, unless it is coupled more closely with efforts to promote learning and improve teaching, and broadened to emphasize not just minimum skills but also those required in higher education, will do little to promote this standard.

NOTES

1. In most of this paper we discuss equal educational opportunity for minorities in terms of blacks' opportunities. We do so not because we think opportunities for other minorities are unimportant, but simply because space constraints make it necessary to limit discussion to one particular minority. Moreover, more evidence is available on black opportunities than on those of other minorities. Despite this focus, we think many of the issues discussed are relevant to equal educational opportunities for minorities generally.
2. There is actually a fairly long tradition of social policies being directed at minimums. For a discussion of this tradition and its relationship to minimum competency testing, see Cohen and Haney (1978).
3. The CBO report termed this composite index of high school rank in class and grade point average "measured ability" because it was called a measure of academic ability in the national survey from which these data were drawn. However, if the distinction, long cherished by psychologists, between achievement and ability means anything at all, surely these terms should not be used interchangeably. After all, saying someone is in the lowest *ability* quartile communicates something different than saying he or she is in the lowest *achievement* quartile.
4. There is one possible exception to the statement that bias resides not in the test itself, but in its use. Specifically, a standardized test may have content that is culturally stereotyped—in terms of sex, race, or other cultural factors. If bias is used to refer to such stereotyping, as it sometimes is (e.g., Flaugher, 1978), then it is meaningful to say that the test *qua* test is biased. Note also that in reviewing the *test* bias literature, we are ignoring a fairly extensive literature on test *item* bias. Oddly enough, the literature on item bias tends to be quite separate from that on test bias.
5. Note that District Court Judge Carr's treatment of the complaint that the Florida literacy test is racially biased is not terribly illuminating. In his opinion in the *Debra P.* vs. *Turlington* (1979) case, he wrote:
   > While some of the questions do seem to have factual settings unfamiliar to certain racial groups, the Court is of the opinion that this distraction is minimal and unpervasive. The Court is not convinced by the Plaintiff's evidence that the test or any item should be invalidated for racial or ethnic bias. (p. 30)

   And in a footnote, Judge Carr noted:
   > The plaintiffs mounted a frontal assault upon a number of practices and procedures utilized by the DOE in the design and implementation of the test. . . . While some of the . . . flaws were indeed errors of considerable magnitude they do not cross either individually or collectively the line between inadequacy and constitutional infirmity. (p. 54)

   We will have to wait until the trial record is available to know exactly how the test bias issue was treated in the Florida case.
6. Prior to 1970, there was another approach to the assessment of test bias; namely that of Guion, which emphasized probability of success rather than regression relationship with the criterion. We avoid discussing it and several other variations because our aim here is to trace only the broad trends of thinking on test bias, not to review the test bias literature comprehensively.
7. The question of the match between the content of minimum competency tests and the content of school curriculum is one which has received remarkably little attention so far. We will come back to the implications of such match—or mismatch—on equality of educational opportunity. Here let us note simply that Madaus et al. (1979), have recently presented empirical evidence to substantiate a point previously made by several observers—namely that the negative findings of researchers like Coleman et al. (1966), and Jencks et al. (1972), regarding effects of schooling may be explained partially by the fact that the standardized achievement measures they employed are not curriculum-sensitive, or in other words, are not well-matched to the goals of schooling.

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